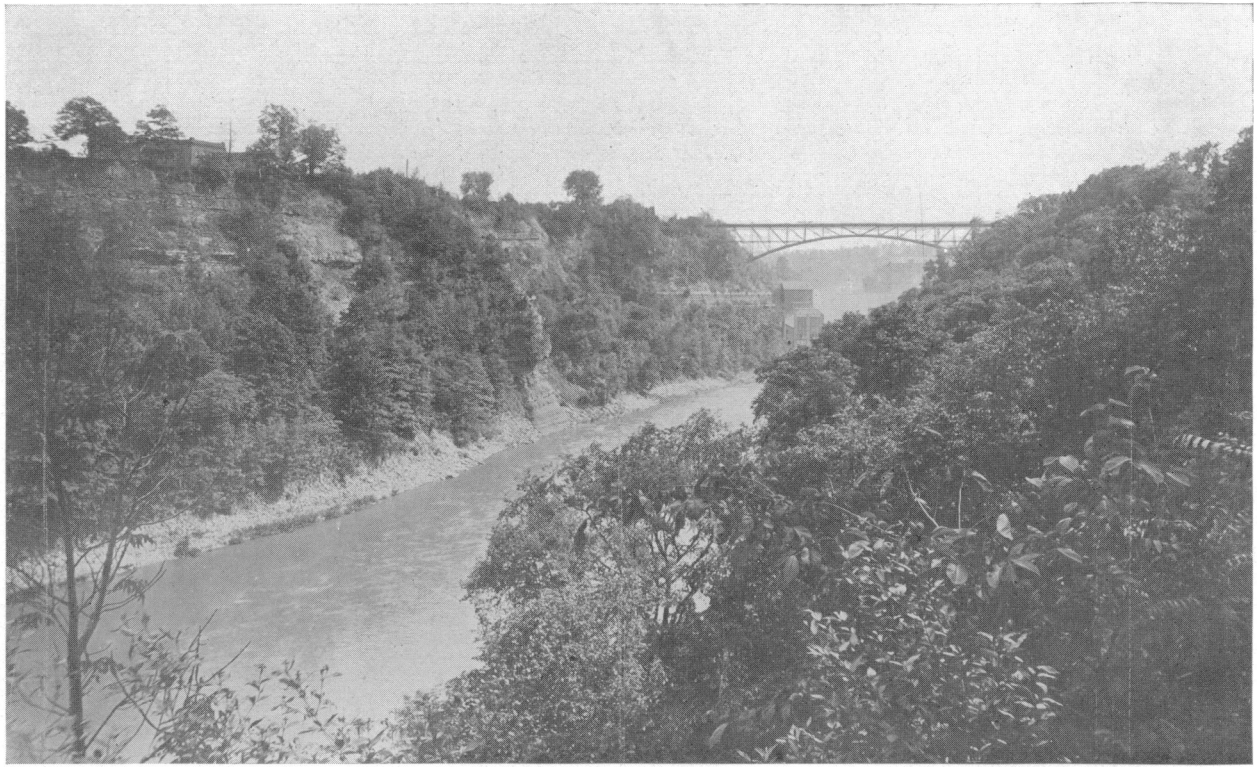

N. R. Graves, Photo.

THE ROCHESTER CANYON. View looking south, upstream, toward Driving Park Avenue bridge.

A NATURE DRAMA

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The Place ..... New York State.
The Time ..... The Pleistocene: some little while ago.
Principal Characters:
A vast Ice Sheet ..... Quebec Glacier.
A Lake ..... Dawson.
A second Lake ..... Iroquois.
A third Lake ..... Ontario.
Two sister Rivers ..... Niagara and Genesee.
Attendant Rivers ..... Dawson Outlet; Iromohawk; Covey; St. Lawrence.
Oceanic Waters ..... Hudson-Champlain; Gilbert Gulf.
An invisible, subterranean Force ..... Diastrophism.[1]
Attendant Atmospheric Agents ..... Epigene.
Solar Energy ..... Sun Heat.

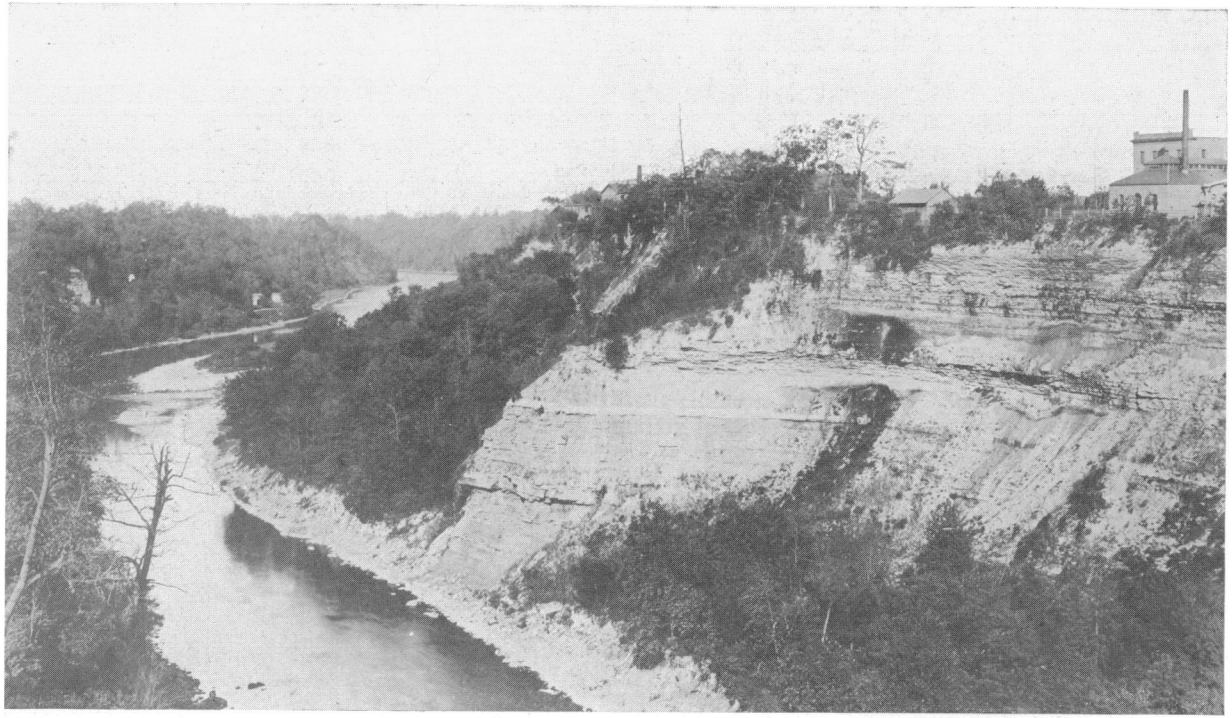
PROLOGUE

Joseph Rodman Drake wrote "The Culprit Fay" with the purpose of producing a dramatic story without human characters. But his characters imitate humans, and the motif and movement of the story are simulation of human action. The present dramatic narration has no human relation whatever. Furthermore, it is not in the least imaginary, but is a recital of actual events, the conflict of the forces of Nature and the interaction of material agents which shape the surface of the globe. The interplay of Nature's forces and processes are as truly dramatic as anything in human action and emotion; and as the milleniums pass the human play seems petty and trivial by contrast with the changes in the earth and the cosmos. And, after all is said, Man is only a phenomenon of nature.

The reader asks for the *purpose* in the drama—the motive which impels the characters. If the reader can tell the purpose of the universe and its activities, of the motive in tide and storm and earthquake, and in the making and shaping of the continents, then he will know the purpose which animated the characters of this drama.

The story here given is merely a translation of the many conspicuous records left by the *dramatis personæ*. The in-

[1] Description of this character will be found in a ponderous volume called Webster's Dictionary.



ROCK STRATA, ROCHESTER CANYON. View looking north from Driving Park Avenue bridge.

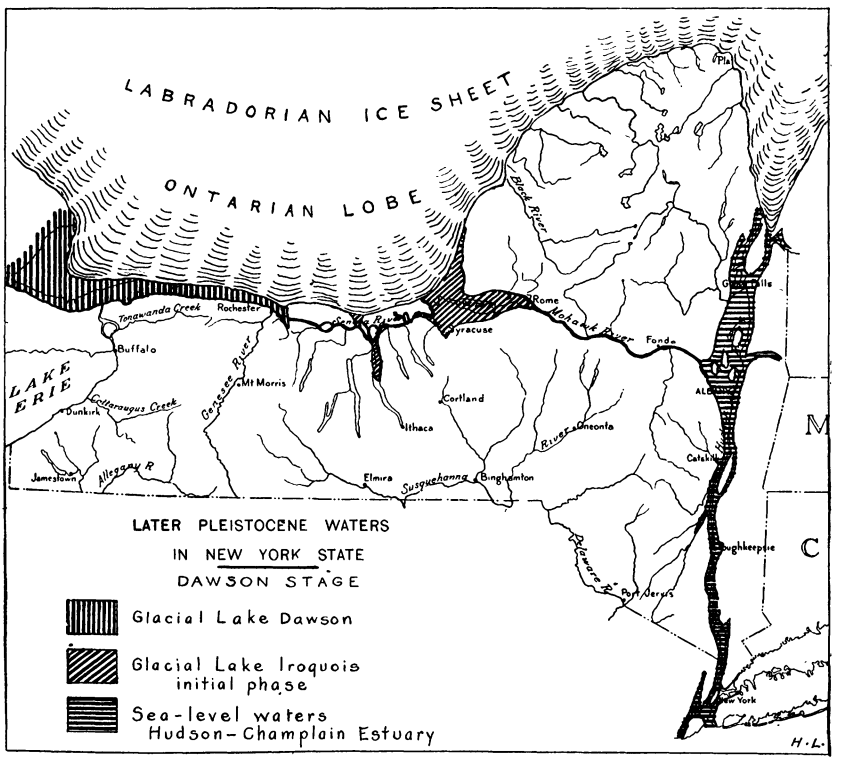


FIG. 1. DAWSON STAGE OF THE GLACIAL WATERS.

scriptions left by the glacier, the rivers, the lakes and seas, are open to observation and are not difficult of interpretation.

The portion of the great drama which is here given covers only the latest episodes in a long series of dramatic and romantic events which have been enacted on the stage of New York State. Some of the actors are yet alive and playing their parts. The earlier scenes have been partially described in the dramatic (geologic) literature.

The story may be epitomized as follows: The forces and processes of the atmosphere, here called Epigene, had created a vast ice sheet, central in Quebec, which had overridden the entire area and had long occupied the stage to the exclusion of the other characters. This dominant performer was now grudgingly yielding room to the other actors, under the compulsion of Sun Heat. Other characters appear on the stage, "strut their little day" (geologically speaking), while some of them have passed away into oblivion. The unseen "villain" of the play, Diastrophism, hereafter called Diastro, is constantly disturbing the equilibrium of the stage and interfering

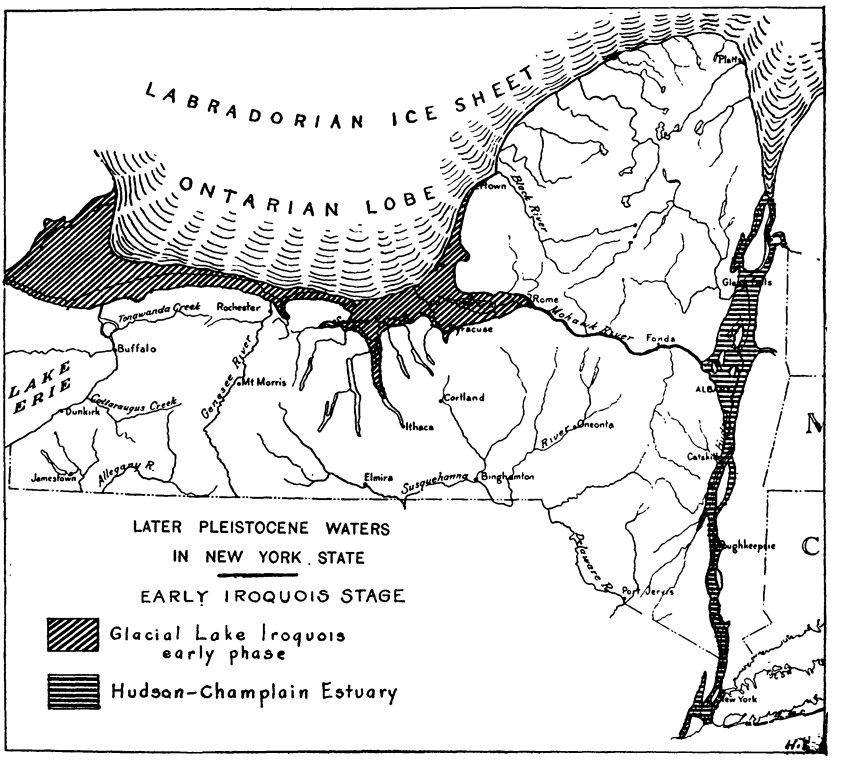


FIG. 2. EARLY IROQUOIS STAGE.

with the visible actors, by raising and tilting the entire stage. This change of level, accompanied by the withdrawal of Quebec Glacier, causes rivalry and changes in the standing waters, the Lakes, and in the appearance and disappearance of the running waters, the attendant Rivers. Finally Quebec Glacier makes its exit and the aqueous and atmospheric performers take the present-time position and relation.

ACT ONE

Scene 1

The stage setting is shown in the diagram, Fig. 1.

Color scheme: Glacier, white; Rivers, green; Lakes, blue.

Quebec Glacier holds the center of the stage.

Enter, Dawson Lake, with Iroquois, and the attendant Montezuma Lake.

Movement

The Glacier, the cold, impassive member of the dramatic group, has been losing power and control, but yet holds the

contiguous waters at high levels. Dawson Lake, the successor of a long sequence of glacier lakes, is confined to the western part of the stage, in the Ontario basin, having altitude 230 feet above the sea. Into this lake pour two rivers, Niagara and Genesee. The former is very young and is now making its debut. The latter is of great age with long life on the stage. Niagara carries, as today, the outflow of the Great Lakes. The Niagara Falls and the upper Rochester cataract are in early life.

The Dawson Outlet River, flowing through Fairport, Palmyra, Newark and Lyons, carries the copious waters eastward, grading a path for human use. This river loses itself in Montezuma Lake, lying in the low ground of Seneca and Cayuga valleys, which lake is itself drained into the young Iroquois Lake, lying in the Syracuse-Rome district. Iroquois Lake has altitude 110 feet above the sea, and outflows at Rome by the Iromohawk (abbreviation for Iroquois-Mohawk) River to final repose in oceanic waters in the Schenectady-Albany district.

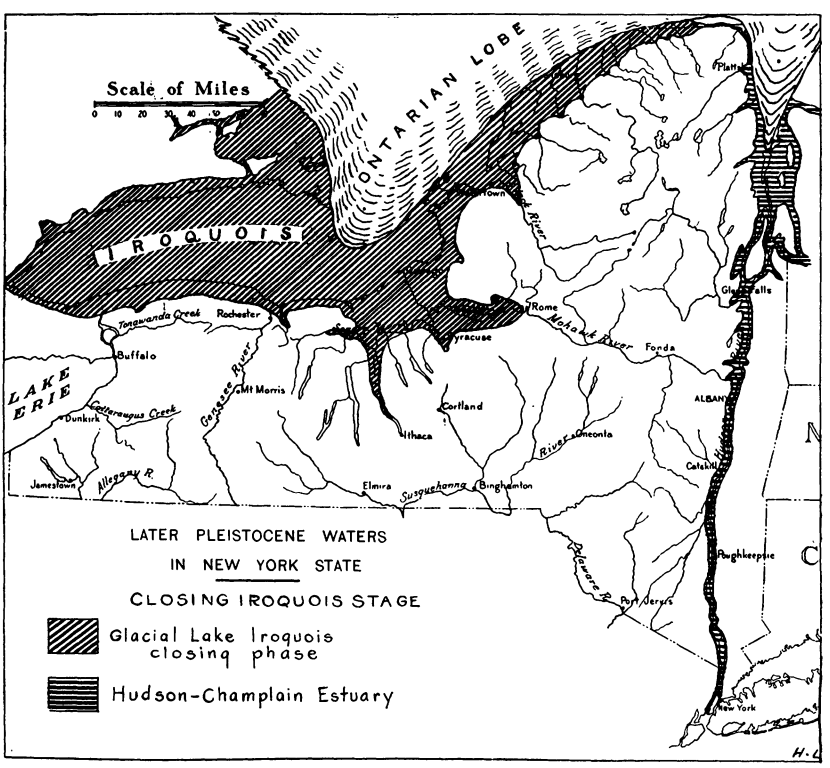


FIG. 3. CLOSING IROQUOIS STAGE.

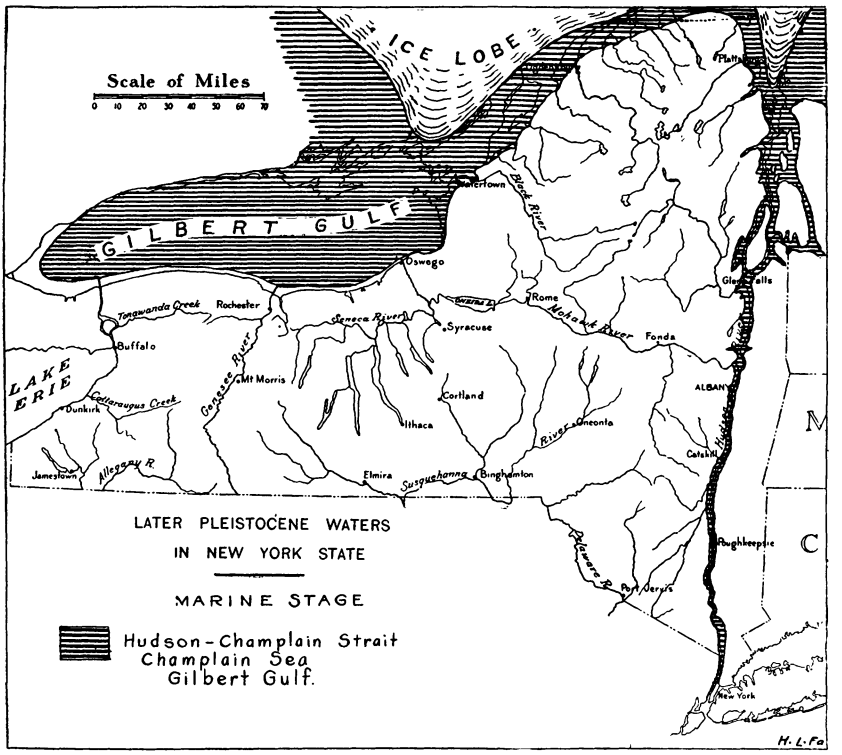


FIG. 4. GILBERT GULF, SEA-LEVEL WATERS.

These great rivers are now grading the lowest path from the Atlantic seaboard to the Great Lakes and the Mississippi Valley.

All the great area which stages this scene was much lower in altitude than it is to-day. The Iromohawk delta, the sand-plain between Schenectady and Albany, was then building at sealevel, or 350 feet lower than to-day. Rome was 350 feet and Rochester 250 feet lower than now. Diastro, the strong villain of the play, begins his slow but irresistible business of lifting the stage, producing the changes in level.

The Oceanic Waters of the Hudson Estuary occupy the slowly rising Hudson Valley.

Closing the scene, Lakes Dawson and Montezuma and their attendant Rivers, exeunt.

Scene 2

This scene is depicted in the diagram, Fig. 2.

Owing to the pressure of Sun Heat the Glacier yields a few miles and the young Iroquois Lake supplants two lakes and attendant rivers of the preceding scene. Iroquois now extends

the whole length of the Ontario Basin, from Rome, N. Y. to Hamilton, Canada.

With Iroquois succeeding Dawson the base-level of the Rivers Niagara and Genesee, and all the minor streams, falls from 230 feet above ocean to 110 feet, and the rivers extend their courses northward to the lower waters (see Figs. 7, 8).

Up to this time Diastro has not seriously affected the progress of the drama, the movement of the play being chiefly due to the weakening and withdrawal of Glacier.

Iroquois Lake clings to Glacier, and expands as the latter wanes.

ACT TWO

Scene 1

The stage setting is shown in Fig. 3.

Exit Iromohawk River.

Sun Heat and Epigene have pressed Quebec Glacier nearly off the stage. At only one point does the latter now interfere

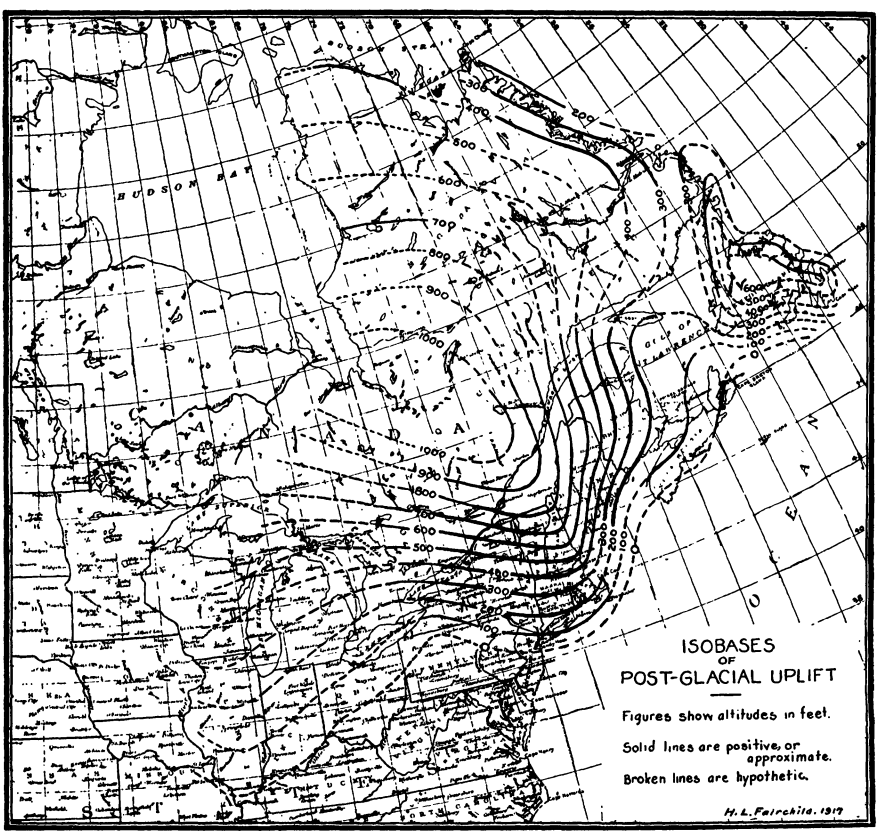
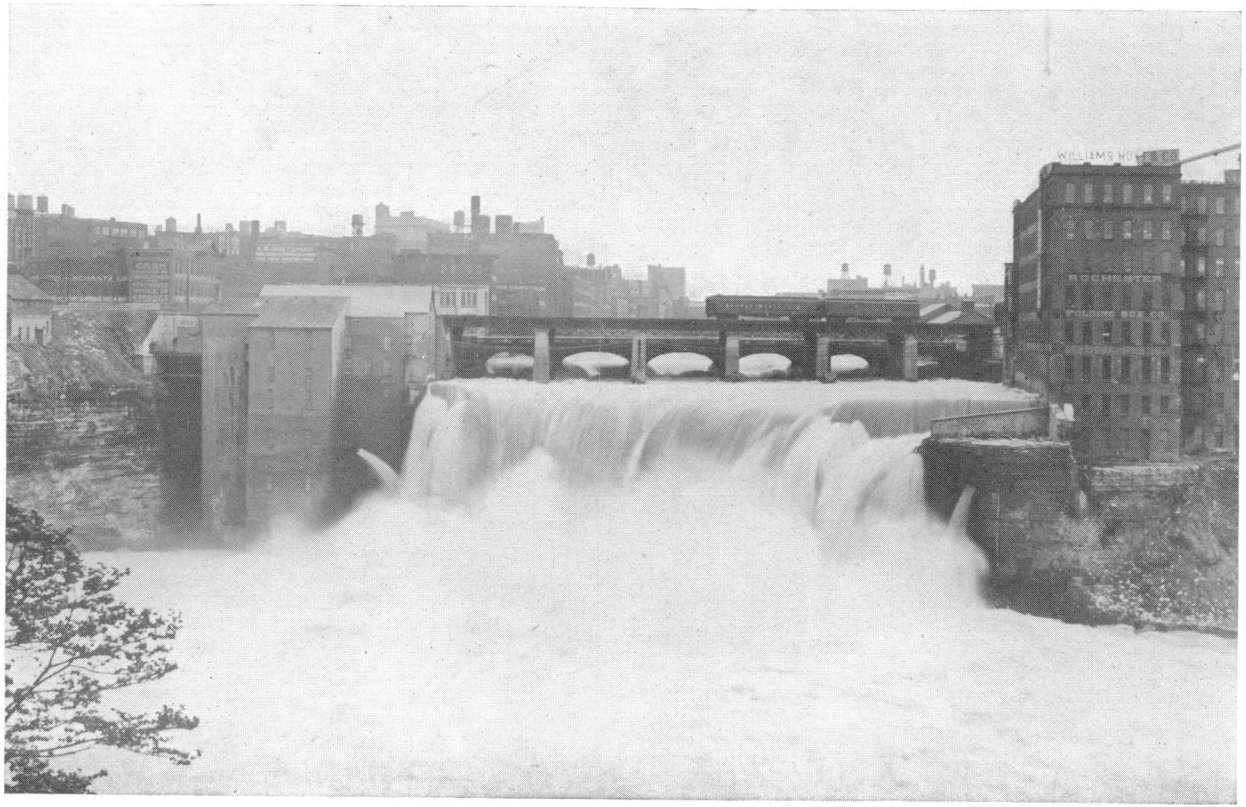


FIG. 5. UPLIFT OF NORTHEASTERN AMERICA.



UPPER FALL, GENESEE RIVER, ROCHESTER, N. Y.

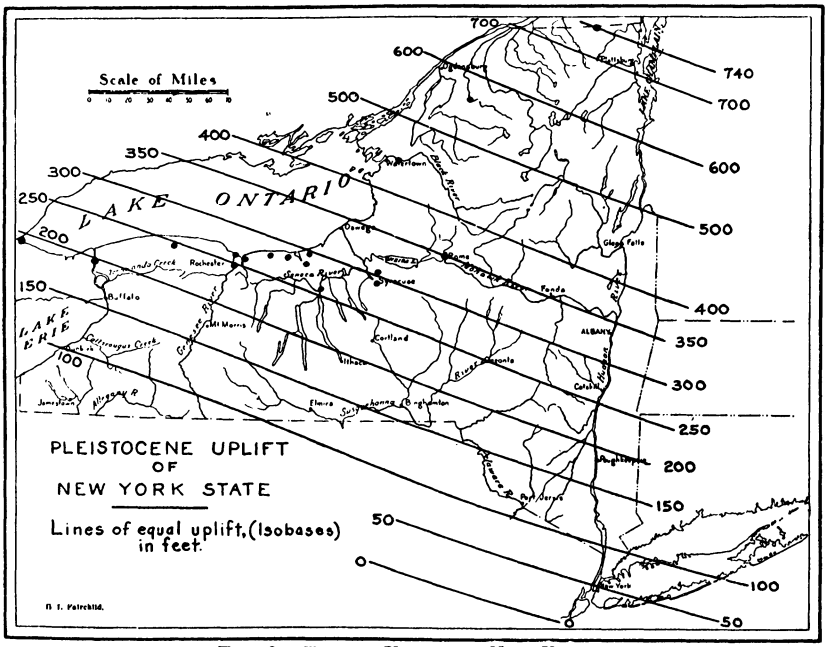


FIG. 6. TILTING-UPLIFT OF NEW YORK.

with the other performers. On the Canadian boundary of New York the Glacier is holding the outflow of Iroquois Lake to a new channel, the Covey pass. The Covey River, on account of lower altitude, is the successor to Iromohawk, carrying Iroquois water to sealevel in the Hudson-Champlain estuary.

Iroquois Lake is at its maximum.

Scene 2

The stage setting is the same as in scene 1.

Quebec Glacier is waning. Iroquois Lake is about to retire. Diastro is the leading performer (Figs. 5, 6).

By the tilting uplift, and the land rise at Rome of 180 feet, Diastro has raised the level of Iroquois Lake from 110 to 290 feet.

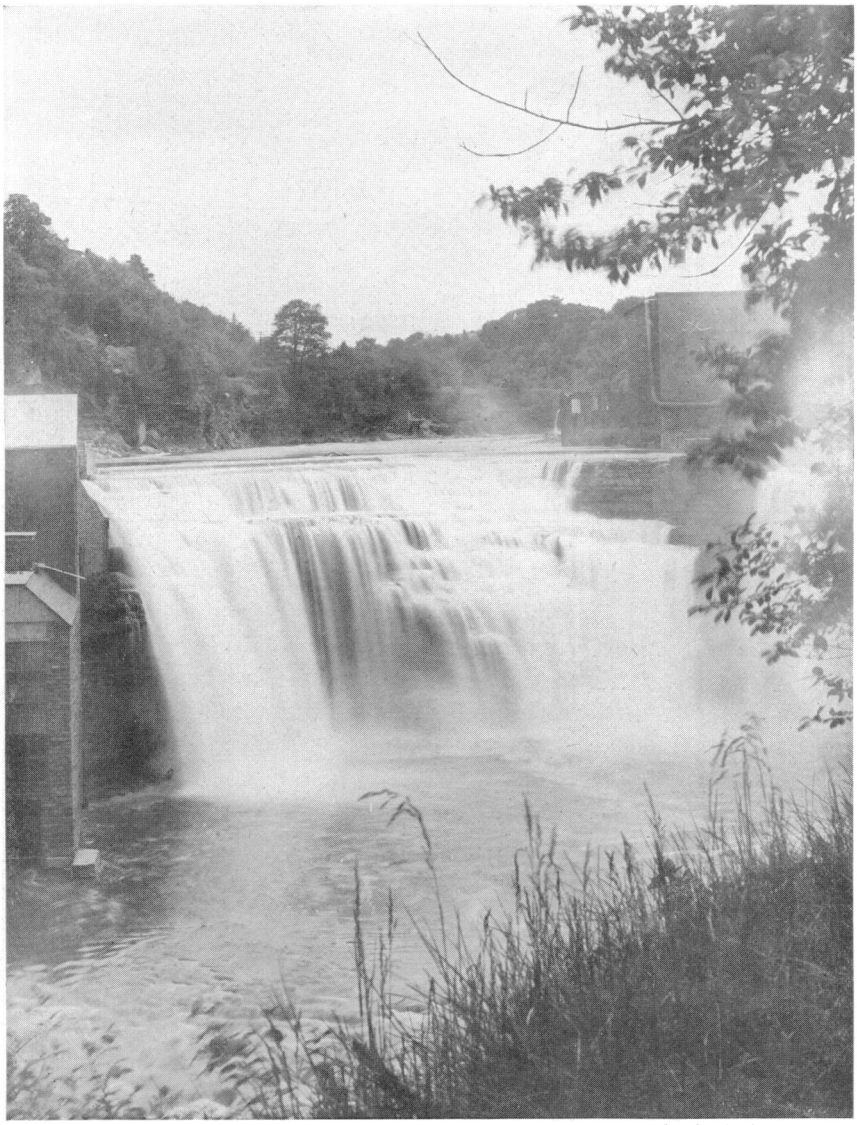
As the land at Rochester has risen only 105 feet the Iroquois water produces a flooding there of 75 feet. The rivers Niagara and Genesee, and their companions, are checked in flow by the rising lake, and their mouths are forced back, up the land slopes (in Figs. 7, 8 from position 2 to position 3).

Exit Iroquois. For New York State the Glacial Period has ended.

ACT THREE

Scene 1

The stage setting is shown in Fig. 4.



N. R. Graves, Photo.

LOWER FALL, GENESEE RIVER, ROCHESTER, N. Y.

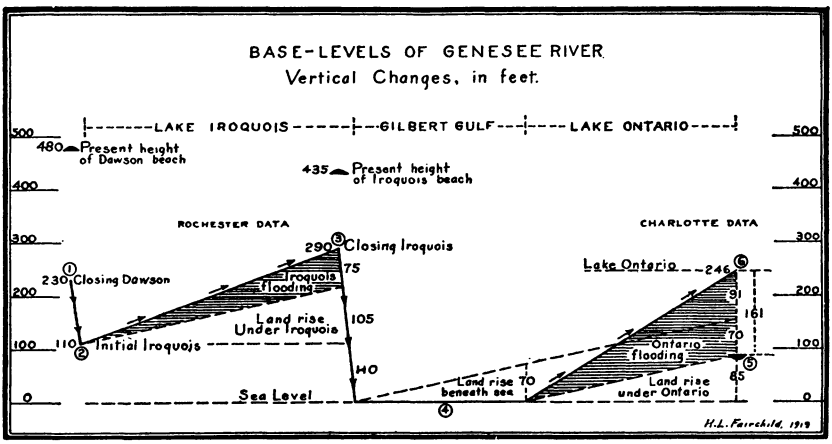


FIG. 7. VERTICAL CHANGES IN THE GENESEE RIVER BASE-LEVELS.

Enter, ocean-level water in the Ontario basin, Gilbert Gulf.

The frozen, damming member of the company has removed from the stage (the area of New York) and stands back in the wings.

Relieved of all interference the water in the Ontario basin falls to sealevel, and Gilbert Gulf succeeds Iroquois Lake. The base-level of all the rivers falls from 290 feet to zero, and the rivers extend themselves far northward to the sealevel water. (In Figs. 7, 8 the mouth of the Genesee shifts from position 3 to position 4.)

Scene 2

Stage setting the same as in scene 1.

The performers are few—the sealevel waters, Hudson-

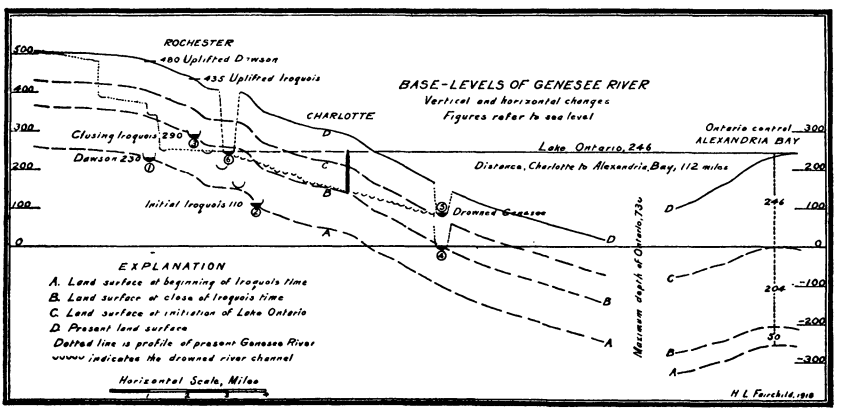
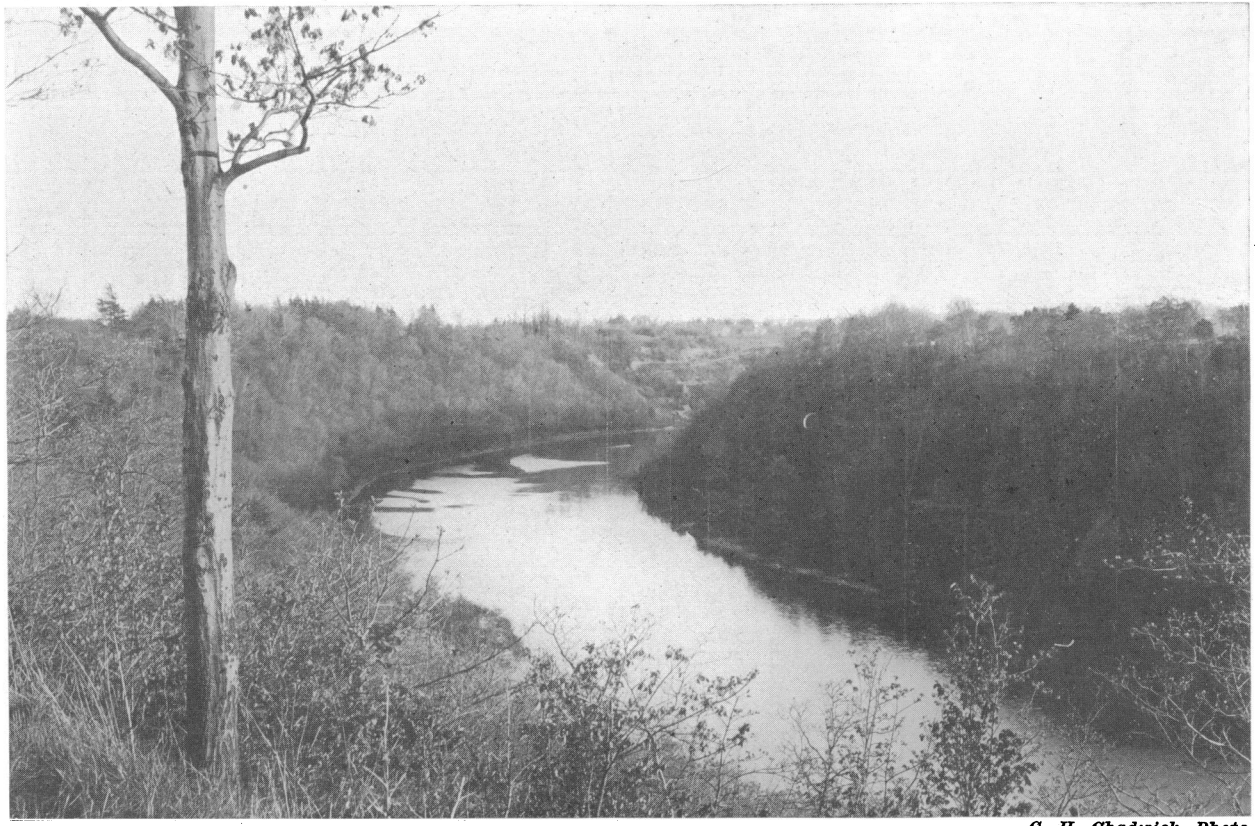


FIG. 8. VERTICAL AND HORIZONTAL CHANGES IN THE GENESSEE RIVER BASE-LEVELS.



G. H. Chadwick, Photo.

THE ROCHESTER CANYON. View looking south, upstream, toward the city. The river at level of Lake Ontario, 246 feet.

Champlain estuary and Gilbert Gulf; the rivers Niagara and Genesee and their attendants; Sun Heat and Epigene with attendants.

The movement is chiefly the action of Diastro, in lifting the northern part of the stage more rapidly. But until the district of the Thousand Islands is raised out of the sealevel waters there is no change of scene.

Scene 3

The setting of the stage is any map of the present geography of New York State.

Exit, Gilbert Gulf.

Enter, St. Lawrence River and Lakes Champlain and Ontario.

Diastro erects a barrier in the St. Lawrence Valley, at the Thousand Islands, which imprisons the waters of Gilbert Gulf and transforms them into Ontario Lake. The uplifting of the barrier continues until Ontario water is 246 feet above the sea.

The embouchures of the rivers are pushed backward, up the land slopes, as had been the case during the rise of Iroquois. (In Figs. 7, 8 the mouth of the Genesee is shifted from position 4 to position 6.)

As Charlotte, the location of the present embouchure of Genesee River, rises only 85 feet while Ontario level rises 246 feet, the flooding by Ontario water has drowned the river channel that was cut in time of Gilbert Gulf (Fig. 4) under 161 feet of water. (The drowned position is indicated by position 5 of the diagrams, Figs. 7, 8).

The quantitative vertical elements showing the total work of Diastro are given in Figs. 5, 6, 7 and 8.

EPILOGUE

Here ends the translation. But the actual drama does not end with this brief relation. The drama is yet in progress, superior to any human cooperation or opposition; and it will continue for millions of years after humanity has run its course and disappears from the earth. The movement of the play takes no note of time. In the far future the stage of New York area may carry changes as dramatic, or perhaps greater, than those recorded in the immediate past.[1]

[1] The detailed story of the events here epitomized is published in *Proceedings of the Rochester Academy of Science*, Volume 6, 1919, pages 1–55, and the general history is given in Bulletin No. 209–210 of the New York State Museum.